

OBSERVATIONS ON THE LIFE HISTORY AND HABITS OF PILOPHORUS WALSHII UHLER.

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For several summers my attention has been attracted by the large numbers of a species of black bug in a neglected apple orchard near Geneva. Specimens sent to Mr. E. P. Van Duzee were kindly identified as *Pilophorus walshii* Uhler, of the family Miridæ.

One of the most noticeable peculiarities of the insect is its superficial resemblance to a large black species of ant and to the nymphs of a Jassid, *Idiocerus provancheri* Van Duzee, both of which are commonly found on the same trees. The color of the nymphs and adults is a dark reddish brown, almost black. The nymphs have a white transverse band near the base of the abdomen; and in the fourth and fifth instars there is a similar one along the posterior edge of the pronotum. The adults have a white transverse band across the middle of the wings, an incomplete white band at the edge of the wings one-fourth way from the base, and a white spot on each side of the scutellum.

During the summer of 1917 the first specimens were found on July 5 and the oldest of these were in the third instar. By the middle of July all stages of the insect were present, but nymphs of the third and fourth instars were the least plentiful. This circumstance seemed to indicate the existence of two overlapping generations, but a comparison with the life history of related insects makes it appear more probable that this condition was the result of a prolonged hatching period. Early in August adults became more numerous, while there was a corresponding decrease in the earlier nymphal stages. From then on the numbers of the insects began to decline so that on September 4 only a few adults could be found, and by Sept. 15 they were absent from the trees entirely.

EGG.

Early in the summer young nymphs were observed crawling about on some strips of bark which had been cut from small apple branches and kept in the laboratory for a few days. It seems probable that they hatched from eggs contained in the bark, but none could be found, even after a diligent search on branches of various sizes.

Eggs were dissected from mature females for description and drawing. They are 1.2 mm. long by .20 mm. wide and slightly curved. At the micropyle end there are two small projections with a roughened surface. The color is white.

FEEDING HABITS.

A curious habit of the insects in concealing themselves among leaves curled by aphids led to observations on their feeding habits. It was found that aphids constitute one of their chief sources of food. Adults and nymphs of all stages jab their beaks into the aphids and suck out part of the body fluids, often withdrawing the beak several times and inserting it again in other parts of the body. When attacked the aphids secrete droplets of fluid from the cornicles and if these touch the beak of *Pilophorus* the latter will withdraw and remove the substance with the fore tarsi before proceeding further with the meal. The mutilated aphids generally die as the result of their injuries.

The bugs were also seen probing with the proboscis among the cast skins of an aphid colony as if lapping up the refuse honeydew dropped by the aphids. They occasionally vary the diet by sucking from a leaf or stem.

Several nymphs and adults were confined in a gauze bag on a fruit spur free from aphids, and although they lived over a week no injury could be detected on the leaves or the apples, either at that time or later.

In the neglected orchard, which is infested with San Jose scale, the bugs were seen running about over the large branches and this suggested the possibility that they might feed on scale insects also. They can see a moving object so far it is rather difficult to get close enough to observe their feeding

habits under natural conditions. However, one was noted with its beak inserted into a large scale, which it punctured in three other places before moving away. Another nymph, confined in a tube with a scale-infested twig, was observed directing its beak into the scales as if feeding on them.

Without further observation I cannot say whether the bugs commonly feed on scales or whether they were not merely sucking plant juices from the bark beneath the scales.

VALUE AS AN APHID DESTROYER.

In order to test the value of the species as an aphid destroyer an experiment was performed, using two small shoots of *Spiraea* infested by these insects. Fifty aphids were allowed to remain on each shoot and care was taken to have them free from predaceous insects. Three nymphs of *Pilophorus* were placed on one shoot and none on the other, and both were covered with bell-jars. Two days later, six aphids were found alive on the first shoot, but ninety-one were present on the control, many of them being small newly-born individuals.

The experiment was repeated using the same number of aphids, and with two adults of *Pilophorus* in one bell-jar. After twenty-four hours one of these had been on the shoot for some time, but the other was still crawling about the bottom of the jar. This shoot contained forty-one aphids, while the control had sixty-five. Both adults were placed on the shoot and the experiment was allowed to run another day, when the first shoot had twenty-three aphids and the control had eighty.

These experiments show that this species, if present in sufficient numbers, might be an important factor in holding in check the natural rapid increase of aphids.

IN RELATION TO ANTS.

The aphid-infested apple leaves are usually attended by ants, among which a large black species is common. Both nymphs and adults of *Pilophorus* are very rapid runners and carefully avoid meeting the ants. The bugs can see a large moving object, such as the hand, at a distance of one foot or more, and can detect the ants when they are several inches away. They are thus able to keep on the opposite side of a branch or

twig so that the ants pass by them. Ants appear to be unable to detect the presence of the bugs at a greater distance than one centimeter. If one happens to get this close it immediately attacks the bug, but it is doubtful if it ever succeeds in catching one.

In consideration of the poor visual powers of the ants and the helplessness of the aphids, it is hard to imagine how the striking resemblance of *Pilophorus* to the ants, with which they are often associated, can be of any value to the species either for protection or aggression. The only logical conclusion seems to be that the resemblance is purely accidental.